

### **REMARKS/ARGUMENTS**

Claims 1-17 remain in this application. Claim 8 has been amended to change its dependency.

**Claims 1-6 are rejected under 35 USC 103(a) as being unpatentable over Wang et al. (US Patent 5,545,595) in view of Borrelli et al. (US Patent 5,483,628) and Auzel et al. (US Patent 5,858,891)**

**Examiner's rejection of Applicant's independent claim 1 based on 35 U.S.C. 103(a) improper for failing to show a reasonable success of suggested combination.** Claims 2-6 depend on claim 1 and, therefore, expressly incorporate the language of claim 1. Therefore, claims 2-6 are also unobvious.

Applicants claims 1-6 are directed to a glass-ceramic rare earth doped fiber which includes a "plurality of crystallites, wherein at least 90% of the rare earth dopant is situated within said crystallites of said glass-ceramic fiber".

The Wang reference is directed to a glass ceramic composition and the process for making this composition, not to a fiber. The Related Art section of this reference (col. 1, lns. 46-48) discloses that making of glass ceramic fiber is difficult because it requires "precise control of the [fiber] preparation conditions, such as temperature, atmosphere, etc", which is "indispensable". The Wang reference does not disclose, teach or describe how to make an optical fiber from the disclosed composition. That is, it does not describe the "indispensable information".

The Borrelli reference discloses a glass-ceramic fiber (such as laser fiber, for example).

The Office Action stated that "It would have been obvious to have the fiber of Borrelli et al with the device of Wang et al., since one would be motivated to incorporate this for lasers as shown by Borrelli et al". Applicants are not sure that they understand this statement because the Wang reference does not disclose a device, but instead discloses the glass ceramic (i.e. material). However, Applicants think that the Examiner means that the glass ceramic material disclosed by the Wang reference could be fiberized because the Borrelli reference teaches laser fibers. (If Applicants misunderstood the Examiner, please let applicant's attorney know.) However, as stated above, the Wang reference does not disclose the "indispensable information" regarding fiberization of the disclosed material, therefore not enabling the making of such fiber. Without such disclosure, in the Wang reference itself, looking for such "precise control conditions" would be akin to looking for a needle in a hay stack. A mere invitation to experiment is not enough to show that the proposed combination is obvious to one of ordinary skill in the art.

**As Examiner knows, a prima facie case of obviousness requires a suggestion or motivation to combine, a reasonable expectation of success, and a teaching or suggestion of**

**all claim limitations. (MPEP §2143.) “Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references,” In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).**

Furthermore, the Berelli and Wang references do not disclose that “90% of the rare earth dopant is situated within said crystallites of said glass-ceramic fiber”.

The Office Action stated that the Auzel reference “teaches at least 100% dopant situated within crystallites” and that it “would have been obvious to one having ordinary skill in the art at the time the invention was made, to have at least 100% of dopant of Auzel et al. with the suggested device of Wang et al. in view of Borrelli et al.”

Applicants disagree with this statement for the following reasons: The Auzel reference discloses a material (a glass ceramic), not a glass-ceramic fiber. There are significant difficulties associated with the fiberization process. The fiberization process is a very special heat treatment process. Not all glass ceramic can be successfully made into the optical fiber. Even more pertinent, even if a desired optical fiber can be manufactured from a given glass ceramic material, it is likely that the fiber will not retain all of the properties of the precursor glass ceramic material. More specifically, the fiberization process is a thermal treatment process that alters the precursor glass ceramic material. The specific alteration will depend on the specifics of the fiberization process (for example specific conditions, “such as temperature, atmosphere, etc”). The specific heat treatment inherent in the fiberization process can change the size of the crystallites and the amount of rare-earth dopant within the crystallites. That is, even if the precursor material has a certain amount of dopant in the crystallites as claimed by the applicants, and even if the crystallites are present in the resultant fiber, the crystallite size may be altered and the resultant fiber may not have the same amount of dopant in the crystallites because of diffusion of dopants during the heat treatment inherent in the fiberization process. Similarly, the size of the crystallites may also be altered, or the resultant fiber may not even have the crystallites.

Therefore, Applicant’s invention is unobvious, absent a teaching, in the cited references, that Auzel material, when made into optical fiber, maintains its crystallite structure and still has the same crystallite composition (i.e., that least 90% of the rare earth dopant is situated within the crystallites of the fiber).

With regard to claim 5, Figure 1 of the Wang reference discloses a glass and the heat treated glass, not the glass ceramic fiber. The Wang reference does not disclose that this heat treatment is equivalent to the heat treatment of the fiberization process. In fact, the Wang reference clearly states that the heat treated product is glass, not fiber. Therefore, the Wang reference does not disclose that “the stimulated emission and absorption line shapes of said

glass-ceramic rare earth doped fiber are narrower than that stimulated emission and absorption profile of its precursor rare earth doped glass”, as claimed in claim 5.

**Claims 7-12, and 14-16 are rejected under 35 USC 103(a) as being unpatentable over Wang et al. (US Patent 5,545,595) in view of Borrelli et al. (US Patent 5,483,628), Auzel et al. (US Patent 5,858,891), and Ainslie et al. (US Patent 4,936,650).**

**Claim 13 is rejected under 35 USC 103(a) as being unpatentable over Wang et al. (US Patent 5,545,595) in view of Borrelli et al. (US Patent 5,483,628) and Auzel et al. (US Patent 5,858,891), and Ainslie et al. (US Patent 4,936,650), as applied to claim 7, and further in view of Arima (US Patent 6,217,204).**

Claim 7 is an independent claim. It is directed to an optical amplifier that incorporates a glass ceramic fiber and “said glass-ceramic fiber including a plurality of crystallites, wherein at least 90% of said rare earth dopant is situated within said crystallites”. As discussed above, the quoted feature is unobvious over Wang et al. (US Patent 5,545,595) in view of Borrelli et al. (US Patent 5,483,628) and Auzel et al. (US Patent 5,858,891). In addition, the cited references do not teach or suggest that this type of fiber is suitable for use in optical amplifiers. A telecommunication field is a very broad field. It utilizes an enormous amount of different devices. There is a big difference between a laser, a transmitter, a receiver, a filter, a transmission fiber, a coupler fiber and an optical amplifier, all of which could be included, for example, in a broad definition of “telecommunication field”. What is suitable for one use or device in this field is not necessarily suitable for another use or device in the same general field.

Therefore, absent a teaching or suggestion, in the cited references themselves, to utilize this type of fiber in the optical amplifier, claim 7 is unobvious over the cited references.

Claims 8--16 depend from claim 7 as their base claims, and therefore, expressly incorporate the language of claim 1. Therefore, claims 8-16 are unobvious for the same reasons that claim 7 is unobvious.

**Claim 17 is rejected under 35 USC 103(a) as being unpatentable over Wang et al. (US Patent 5,545,595) in view of Borrelli et al. (US Patent 5,483,628) and Auzel et al. (US Patent 5,858,891), and Ainslie et al. (US Patent 4,936,650), as applied to claim 7, and further in view of Samson et al. (WO 98/02388).**

Claim 17 depends from claim 7 as its base claim and further states that the “rare earth dopant is Nd and said optical amplifier characterized by a shift in ESA spectrum in 1320 nm to 1360 nm wavelength range, with respect to emission of said rare earth doped glass-ceramic fiber”.

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Claim 17 is not obvious over the cited references because its base claim, claim 7, is not obvious over the cited references. Furthermore, the Samson reference discloses an Nd doped glass, not glass-ceramic. A glass does not have a crystallite structure claimed by the applicants. Therefore the Samson references do not disclose an equivalent material and is not properly combinable with the other references.

### CONCLUSION

Based upon the above amendments, remarks, and papers of records, applicant believes the pending claims of the above-captioned application are in allowable form and patentable over the prior art of record. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Applicant believes that no extension of time is necessary to make this Reply timely. Should applicant be in error, applicant respectfully requests that the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Reply timely, and hereby authorizes the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 03-3325.

Please direct any questions or comments to Svetlana Z. Short at 607-974-0412.

Respectfully submitted,



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